Appendix C

Agricultural Report
For Proposed Residential Subdivision
and Seniors Living
Lot18 DP 627632 and Lot 22 DP1170438
49 Elouera Terrace, Bray Park NSW 2484

Melaleuca Group Pty Ltd

Date: 24th June 2019

Prepared for:
Marjan Management Pty Ltd

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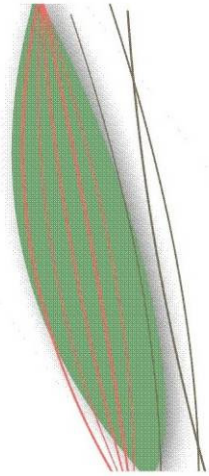

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Melaleuca Group Pty Limited

1. Introduction

Melaleuca Group has been engaged by Marjan Management Pty Ltd to undertake an Agricultural Assessment for 49 Elouera Terrace, Bray Park NSW 2484 (the site) to allow a proposed Residential Subdivision and Seniors housing development on part of the Site. The proposal will subsequently include standard residential allotments from 450m^2 and seniors housing dwellings on 150-250m^2 parcels with community facilities. It is understood the proposal covers an area of approximately 7.7ha, which comprises:

- 1.2ha of zoned residential land earmarked for standard residential subdivision; and
- 6.5ha Site Compatibility Certificate (SCC) footprint to facilitate seniors housing (approx. 4.5ha) and associated services, buffering and development area (approx. 2ha).

Please refer to Figures 1 and 2 for the site locality plan and a plan showing the proposal.

The objective of this assessment is to assess the agricultural impact of the proposed development.

2. The Study Area

2.1 Site Identification

The Study Area (or development proposal) is located approximately 2.7km south-west of the Murwillumbah CBD. The Study Area is located across two parcels namely (note areas approximate only):

- Lot 18 DP 627632 - 6.5 ha; and
- Lot 22 DP 1170438 - 28.8 ha.

The Subject Site is Area is bound by the Tweed River in the south and south-west, residential lands to the west and agricultural/rural-residential lands to the north and east. The proposal adjoins residential lands with entry to the proposal from Elouera Terrace.

2.2 Zoning and Proposal

The Study Area is zoned RU1 – Primary Production and R2 – Low Density Residential (Tweed Shire Council's Local Environmental Plan (LEP), 2014). Surrounding lands are similarly zoned.

Approximately one third of the proposal would be contained within the current R2 Zone with the remaining portion within RU1 Zoned lands. Thereby, the RU1 area seeks approval through a Site Compatibility Certificate (SCC) process as part of the proposal to allow land use permissibility.

2.3 Site Usages

Information pertaining to the historical landuses are limited to information the following information:

- Historical aerial from 1980;
- Recent aerials from 2000 onwards;

- Cadastral Map from 1983;
- Information from 4th generation owner (Mr Paul O'Connor);
- Available mapping from Tweed Council's website; and
- Site investigations.

As advised by Mr O'Connor, the family has held the land for approximately 120 years. The original property covered a substantially larger area including current Lots 20 and 21, the residential area to the west and lands to the east. Several activities have occurred during this period including subsistence farming, dairy, piggery and small crops (e.g. vegetables such as zucchini). Sugar Cane commenced in 1971 and ceased in 2007. Beef cattle grazing has occurred since this time.

Mr O'Connor advised large portions of the residential lands to the west were compulsory acquired by Council (for the water treatment plan), Commission Homes and Education Department with few allotments privately subdivided. These lands being on the upper areas of the original holding resulted in the loss of lands utilised mainly for small crops. It is noted, some Sugar Cane was grown on the elevated areas in the 1970s.

Mr O'Connor advised the area under Sugar Cane became financially unviable with the level of inputs required. Diversifying into higher valued crops such as Macadamias were investigated, however, the risk of flooding proved these enterprises would also be unviable. For example, the recent flood (2017) resulted in some of the lower levels of the property being underwater by several metres. Tree crops such as Macadamias would not be able to withstand the depth or velocity of these flood waters. Mr O'Connor advised the flooding in 2017 was the worst he had experienced with flood waters extending across the majority of the site with the exception of the elevated areas where the existing dwelling and buildings are located (i.e. where proposal is located). Mr O'Connor advised the cattle grazing is viable with other options being high intensive enterprises such as hydroponics or mushrooms may be options. These enterprises require a small footprint and such buildings could be located on flood-prone land.

This information is supported by available historical information and site investigations. Available historical imagery (1980; Figure 3) indicate much of the property was producing Sugar Cane. Whereas recent imagery (Figure 4) indicate much of the site is used for cattle grazing. This was confirmed during site investigations. The dwelling and associated buildings can been seen in all imagery. The 1980 image depicts the expansion of the residential area from the north-west with dwellings along O'Connor Drive visible. The 1983 Cadastral Map (Figure 5) indicate the approval of residential subdivision to the current end of Elouera Terrace with dwellings in the allotments visible in the 2017 imagery.

The information pertaining to the flooding of the site is supported by available information on Council's website that indicate the majority of the Site would be inundated with major floods (Figure 6).

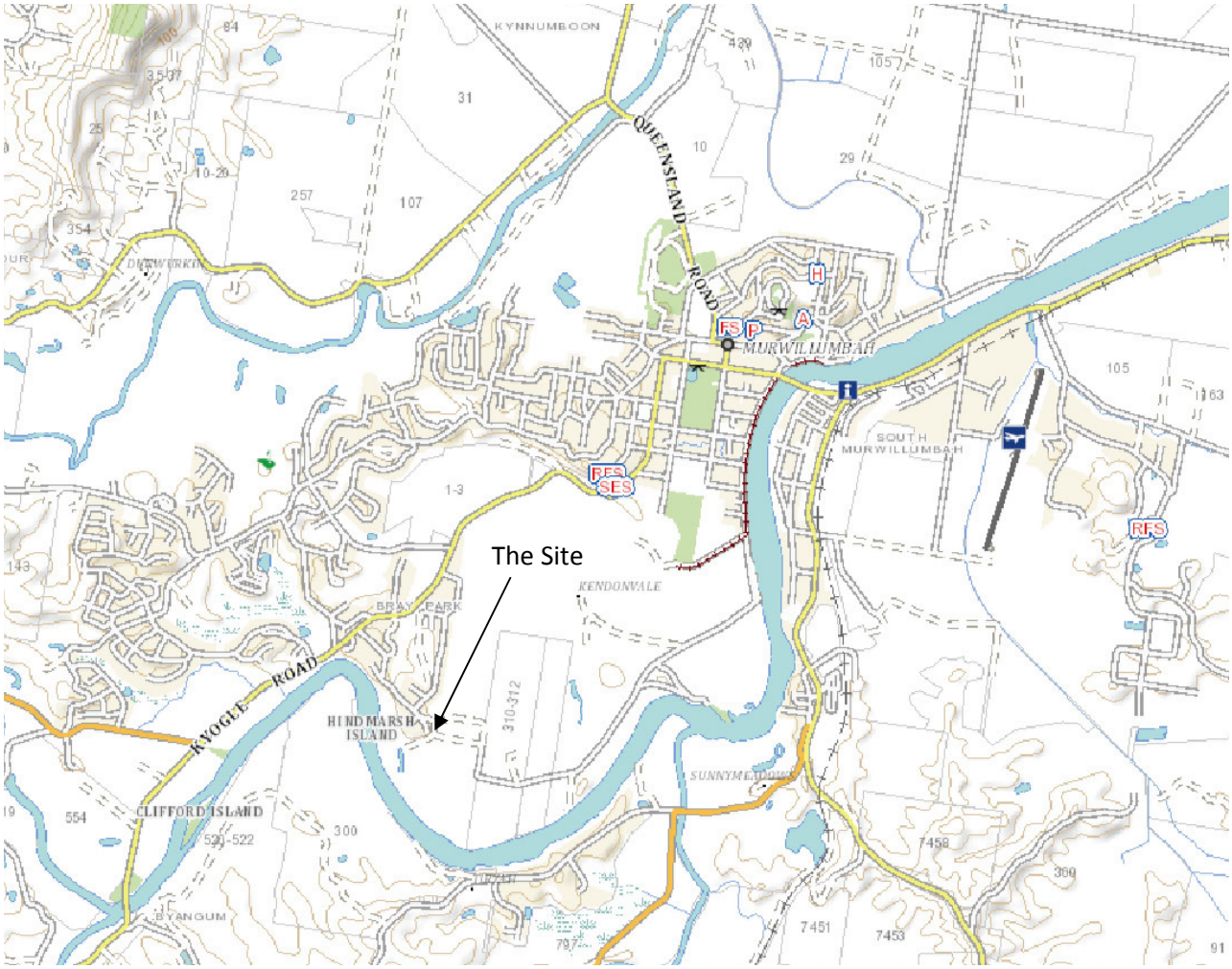


Figure 1. Location Plan

Elouera Terrace, Bray Park
Concept Layout Plan

Seniors Housing Type 1A
Seniors Housing Lots 18m depth average.
Average Lot Size 150m^2
Single Storey Attached Dwellings in groups of 2-3
Typical template used: 2 bedroom, single carpark per dwelling (one covered)
Yield: 82

Seniors Housing Type 1B
Seniors Housing Lots 18m depth average.
Average Lot Size 200m^2 - 250m^2
Single Storey Attached Dwellings in groups of 2-3
Typical template used: 2-3 bedroom, 2 x tandem carparks per dwelling (one covered)
Yield: 57

Primary Access Street (Indicative)
16.0m wide road reserve, 9.0m sealed. TSC 'Wider Access Street'. This street provides a loop road through the development, connecting the primary and secondary site entry points to Elouera Terrace.

Indicative Internal Street
10.0m wide road reserve, 6.0m sealed.

Indicative Internal Laneway
8.0m wide laneway reserve, 6.0m sealed.

Low Flow Flood Area
Area identified through topographic analysis as area of low flow flood area. Nil development proposed within this zone. Potential buffer planting located within this zone to transition to surrounding farmland. Development within this area would be subject to relevant flood considerations and design.

Indicative Community Facilities 01
Community facilities area. Primarily services the northern residential precinct (Residential Type C). Potential to include pool area, lawn bowls, landscaped gardens, areas of open turf. Community use building, footprint illustrated approximately 350-400m^2. Located to take advantage of views to the east and south across existing farmland. Located at the eastern end of the primary site entry to allow clear line of site through the development of the primary community facilities and to long views to the east.

Indicative Community Facilities 02
Community facilities area. Primarily services the southern residential precinct (Residential Type B). Potential to include pool area, lawn bowls, landscaped gardens, areas of open turf. Community use building, footprint illustrated approximately 350-400m^2. Located on an elevated site to take advantage of views to the east and south across the residential precincts and over existing farmland. Located at the primary entry of the estate to serve as the 'entry statement' of the development and create a clear and legible arrival.

Indicative Site Entry
Site entry off Elouera Terrace To be confirmed through residential subdivision layout. Subject to relevant approval.

1 Visitor Parking
Visitor carparking indicative locations illustrated. Requirement based on number of dwelling sites: 20.
Car parking located primarily in close proximity to community facilities areas(qty: 20) with balance of spaces located throughout the development where layout permits.
Total visitor carparks illustrated: 40.

3 Existing Agricultural Land
Working farm located to balance of lot. Potential to provide informal pedestrian access from the proposed development (from Community Facilities 01) to facilitate potential for community gardens and integration of these landuses.

4 Existing Residential Area

Indicative Bus Pick up point

Area 1 Seniors: 45.272 m2

Area 2 Buffer: 20.039 m2

Area 3 Residential Subdivision: 12.728 m2

Figure 2

PLANIT

Figure 3. Historical Aerial - 1980

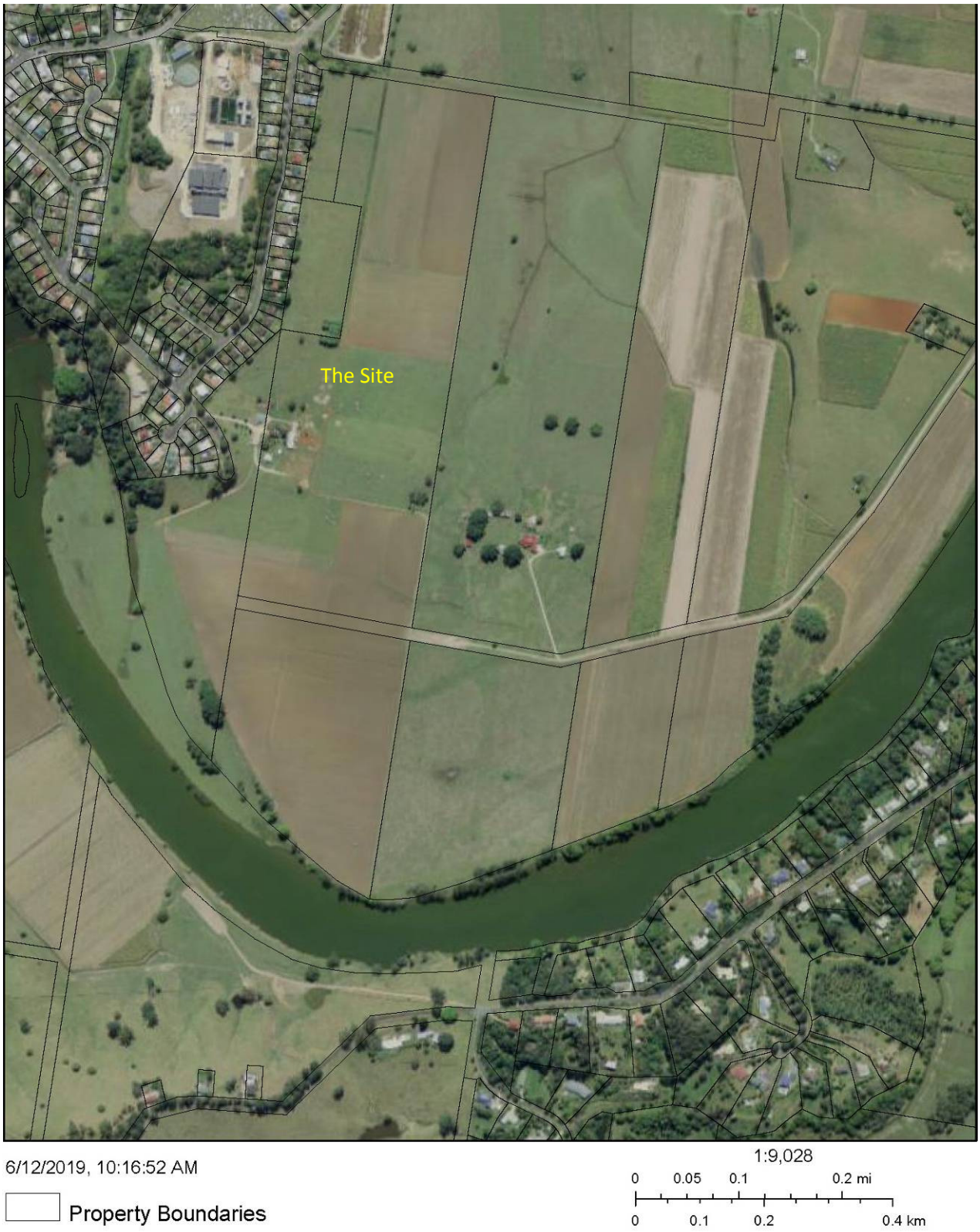


Figure 4. Recent Aerial - 2017

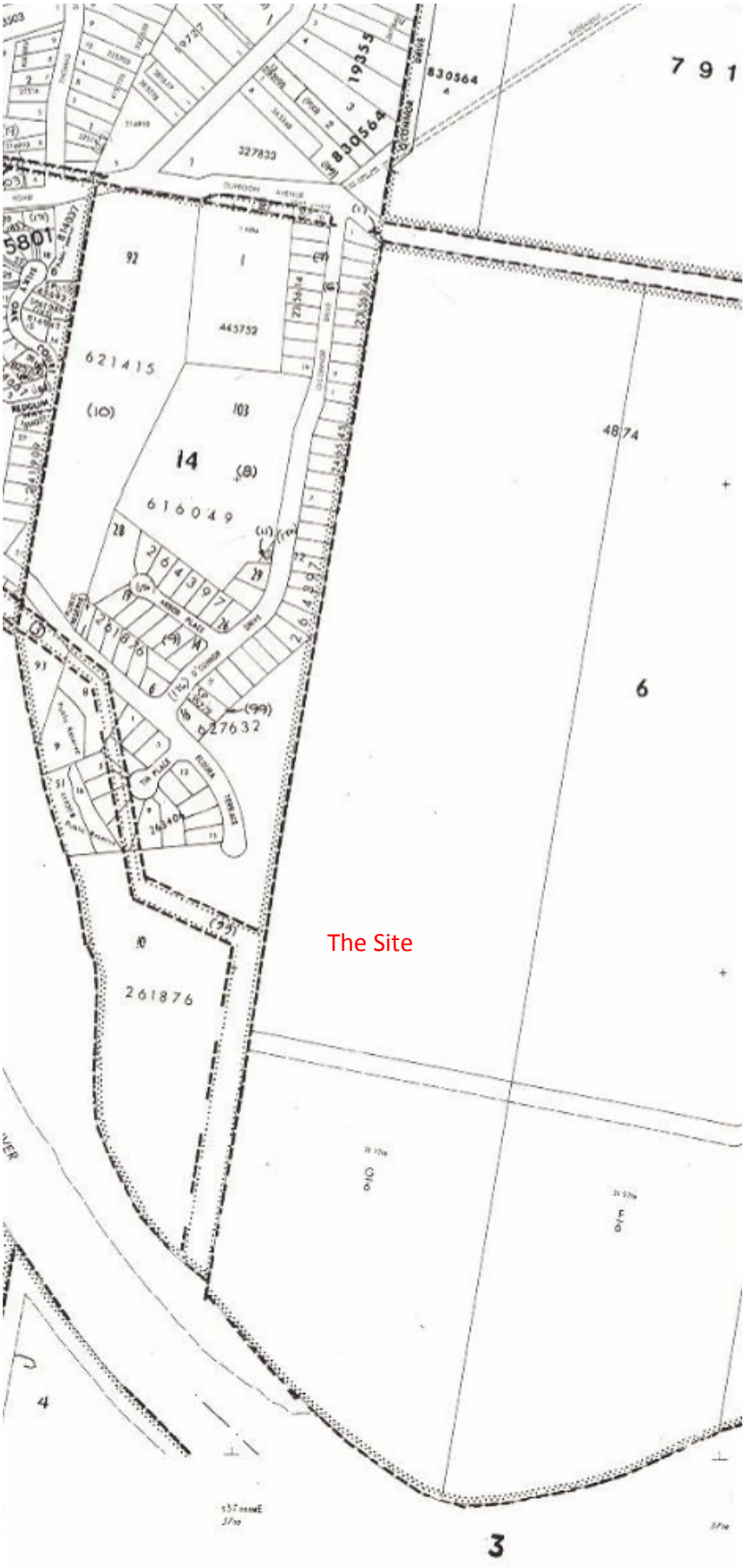


Figure 5. Historical Cadastral Map - 1983

Figure 6. Flood Mapping.

Given the generic history of the locality and available information, it is likely the Subject Site (and Study Area) was settled and cleared around 150 - 180 years ago with the establishment of large pastoral properties in the area. Initially, principal uses were likely to be grazing animals and subsistence farming. Establishment into dairy and a subsistence piggery would have soon followed and is likely to have ceased around 1950/60s. Establishment into broad acre cropping (e.g. predominantly Sugar Cane such as that on the site from 1971) would have followed and is the typical agricultural pursuits of the area of today. However, with the reduction in farm size and increases in inputs, financial viability of such enterprises is difficult. Based on information available, the property to the east (Lot F DP4874) cattle grazing appears to have been maintained for a long period (1980 and 2017 images). Further east (Lot E DP4874) appears to have been regularly under cultivation (surmised Sugar Cane) during this same period. Within the locality, enterprises appear to be Cattle grazing or Sugar Cane during this time period. Diversification into other crops such as Macadamia has not occurred in the locality in comparison to areas further south (e.g. Ballina/Chatsworth/Harwood). It is surmised the flood characteristics of the Tweed River do not favour this diversification.

Plates 1 to 3 show general views some of the site in June 2019.

Plate 1: General view of dwelling and farm infrastructure

Plate 2: General view of southern section of Subject Site

Plate 3: General view of northern section of Subject Site

2.4 Topography

The Subject Site slopes from the western boundary to the north, south and east. At its highest point (near Elouera Terrace), elevation is approximately 25m AHD. The flat area of the site (which represents the majority of the site) are approximately 8m AHD.

The proposal is located on the elevated sections of the site from approximately 10m AHD upwards.

2.5 Local Geology and Soil Description

NSW DPI (2004) describes the geology of the Study (development) Area as Neranleigh-Fernvale beds. Morand (1996) also describe the geology of the Study Area as being the Palaeozoic Neranleigh-Fernvale Group.

The geology of the lower sections of the site are described as Quaternary Alluvial Plain or Quaternary alluvium or estuarine sediments.

The soils of the upper areas (i.e. within the proposal area) are identified as *Billinudgel* Variant a (**bia**) by Morand 1996. These represent very low hills forming footslopes to greater relief of the more common morphology of the **bi** soils. The **bia** soils are described by Morand (1994) as:

> **Landscape** – very low hills forming footslopes. Relief 10-30m, slopes less than 10%. Partly cleared open eucalypt forest.
>
> **Soils** – deep (>100cm), moderately well-drained Yellow Podzolics Soils (Dy 5.21, Dy4.11) and Red Podzolic Soil/Red Earths (Dr 5.21) on siltstone.
>
> **Limitations** – hardsetting, shallow, stony and erodible soils of low fertility.

Soils of the lower areas of the site are identified as *Tweed* (tw) or *Oxley* (ox) by Morand 1996. These are described as:

Tweed (**tw**):

> **Landscape** – extensive marine plain of lower Tweed catchment consisting of deep Quaternary alluvium and estuarine sediments. Local relief <1m; elevation 0-3m; slopes >3%. Totally cleared closed-forest (rainforest) now predominantly sugar cane.
>
> **Soils** – deep (>200cm), poorly drained Brown Alluvial Clays (Gn3.21, Uf6.22) on levees; deep (>200cm), poorly drained Humic Gleys (Uf6.61, Hn2.81, Dy5.11) on backplain.
>
> **Limitations** – flood hazard, high watertables, waterlogging and stream bank erosion hazard. Entensive occurrence of potential acid sulfate soils; highly acid, erodible, impermeable and plastic soils which have high aluminium toxicity potential, low wet bearing strength and which are hardsetting.

Oxley (**ox**): (Morand 1996)

> **Landscape** – level to gently undulating alluvial plains of the mid Oxley and Tweed catchments. Slopes <2%, local relief <9m, plain width 250-1000m. Inset terraces are common. Extensively cleared closed-forest (rainforest).

Soils – shallow to moderately deep (up to 100cm), imperfectly drained Alluvial Soils and/or minimal Prairie Soils (Um5.51) on floodplain/bar plain. Deep (>200cm), moderately well-drained minimal Prairie Soils and dark Alluvial Clays (Uf6.32, Uf6.31, Um6.41) on alluvial plain.

Limitations – flood hazard, stream bank erosion hazard, highly erodible soils, localised waterlogging, localised permanently high watertables, stoniness.

Observations recorded during site investigations indicate the above soil landscape descriptions are correct. Some slight variations between boundaries may occur and detailed soil investigations to determine this are not required for this assessment.

2.6 Surface Water

The Study Area is bounded in the south by the Tweed River.

2.7 Agricultural Land Classification

Five (5) available mapping data sets were available for review, namely:

- Land Capability Mapping (Emery 1985 Soil Conservation Service of NSW);
- Land and Soil Capability Mapping (NSW OEH 2012, based on 1986 mapping);
- Biophysical Strategic Agricultural Land (BSAL) Mapping (Department of Planning and Environment 2013);
- North Coast Agricultural Land Classification (or Agricultural Land Suitability on Council's online mapping); and
- Farmland of State and Regional Significance.

Land Capability Mapping (1985) shows the majority of the Study Area and Subject Site as:

- Class 2 - Suitable for Regular Cultivation: Soil conservation practices such as strip cropping, conservation tillage and adequate crop rotation; and
- Urban Area - located in north-west section of proposal area.

Land and Soil Capability Mapping (NSW OEH 2012 based on 1986 mapping) shows the Study Area within:

- Class 3 - Moderate limitations. Land capable of sustaining high impact land uses using more intensive, readily available and accepted management practices;

That is, this mapping takes into a number of attributes including:

- Soil acidity;
- Water;
- Soil structure;
- Wind erosion;
- Shallow rock;
- Salinity;
- Mass Movement; and
- Water logging/flooding.

This mapping is considered relatively old and while subsequent mapping has utilised these maps, these are considered superceded. However, they do provide historical information for revision purposes.

The BSAL (2013) mapping is considered contemporary. This mapping does not indicate any of the Study Area or the Subject Site being within the bounds of strategic agricultural land.

North Coast Agricultural Land Classification (or Agricultural Land Suitability on Council's online mapping; Figure 7) shows the majority of the Study Area and Subject Site as:

- Class 3 - Suited to grazing, including the use of improved pastures. Cultivation is limited to cash or forage crops in rotation with pastures.

The remaining Study Area is mapped as:

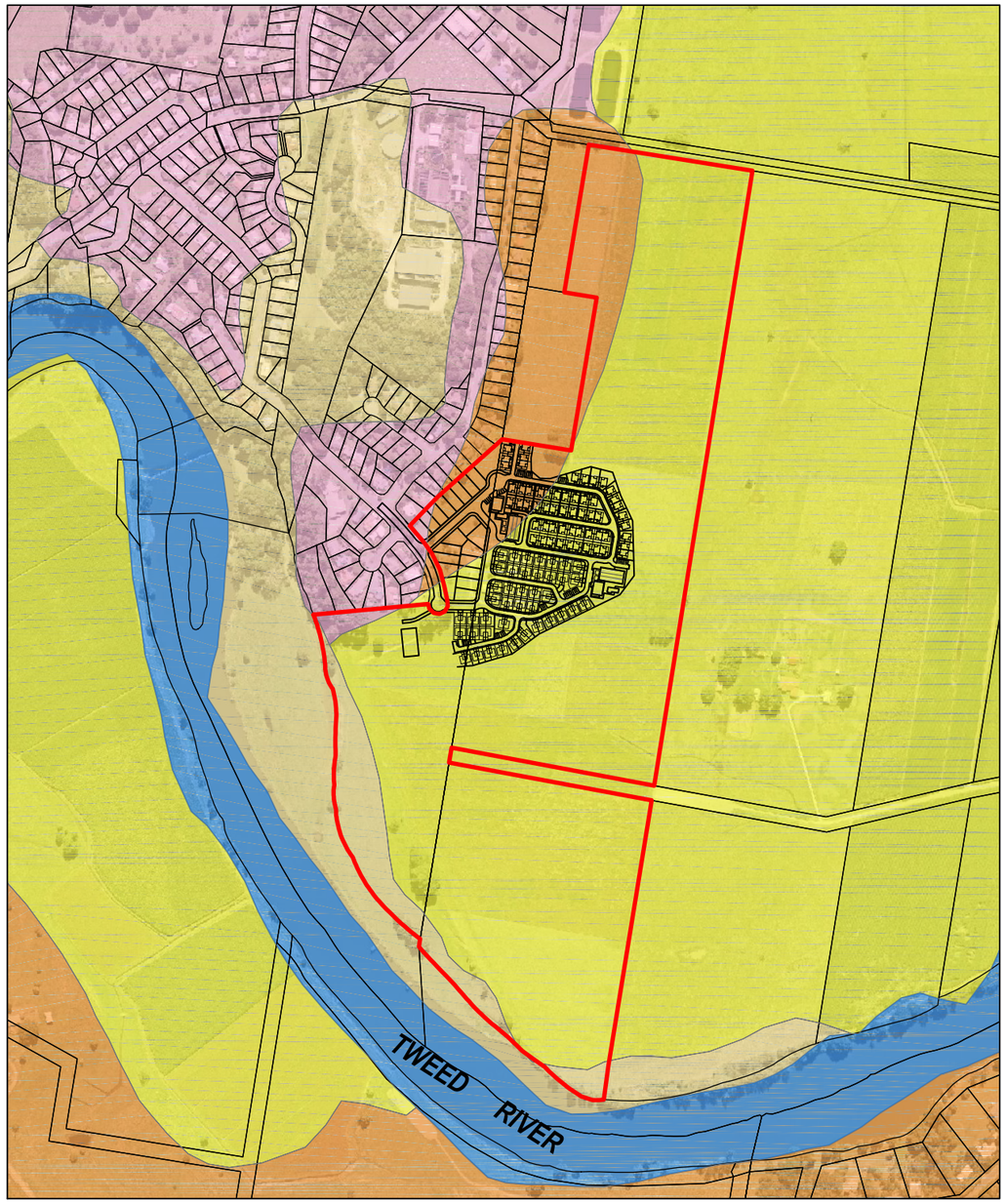
- Class 4 - Suitable for grazing, but not for cultivation. Pasture improvement relies on minimum tillage techniques. Productivity may be seasonally high but overall is low as a result of major environmental constraints; and
- Class 9 or Urban Area.

Farmland of State and Regional Significance; Figure 8) shows the majority of the Study Area and Subject Site as:

- Regionally Significant Farmland.

The remaining Study Area is mapped as:

- Other Rural Land; and
- Committed Urban Use or Rural-Residential Zone.

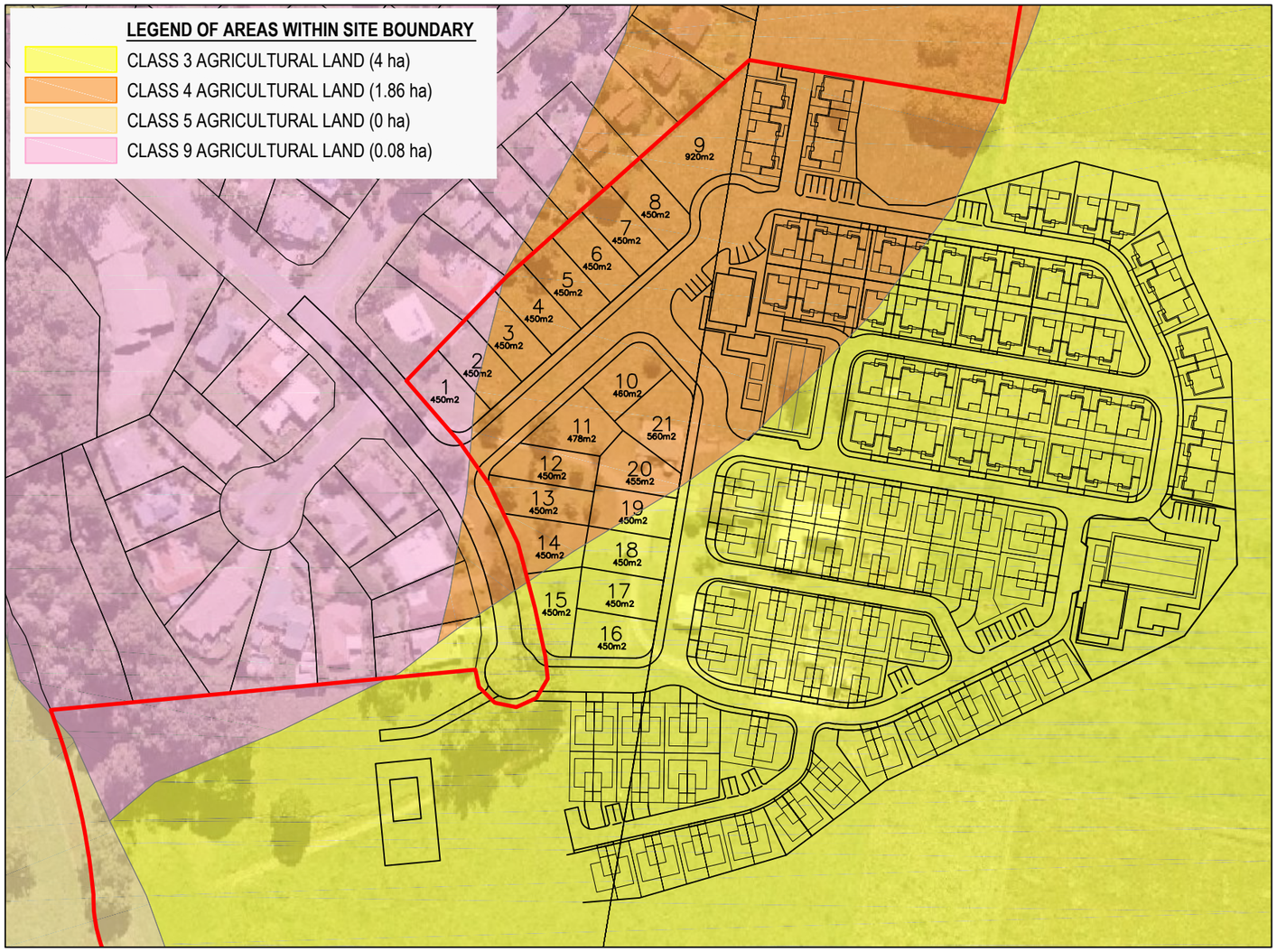


PLAN OF SITE BOUNDARY WITH
NORTH COAST AGRICULTURAL LAND CLASSIFICATION

SCALE: 1:8000

LEGEND OF AREAS WITHIN SITE BOUNDARY

- CLASS 3 AGRICULTURAL LAND (29.95 ha)
- CLASS 4 AGRICULTURAL LAND (3.9 ha)
- CLASS 5 AGRICULTURAL LAND (2.4 ha)
- CLASS 9 AGRICULTURAL LAND (0.3 ha)
- SITE BOUNDARY, 36.55 ha Approx.



PLAN OF DEVELOPEMENT WITH
NORTH COAST AGRICULTURAL LAND CLASSIFICATION

SCALE: 1:2000

MGA

Figure 7

SOURCE:
AERIAL: https://maps.six.nsw.gov.au

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Dwg. No.	MG19009-PL02	Sheet No.	2 of 2
		Issue	A

160 80 0 200 400
SCALE 1:8000 AT A3

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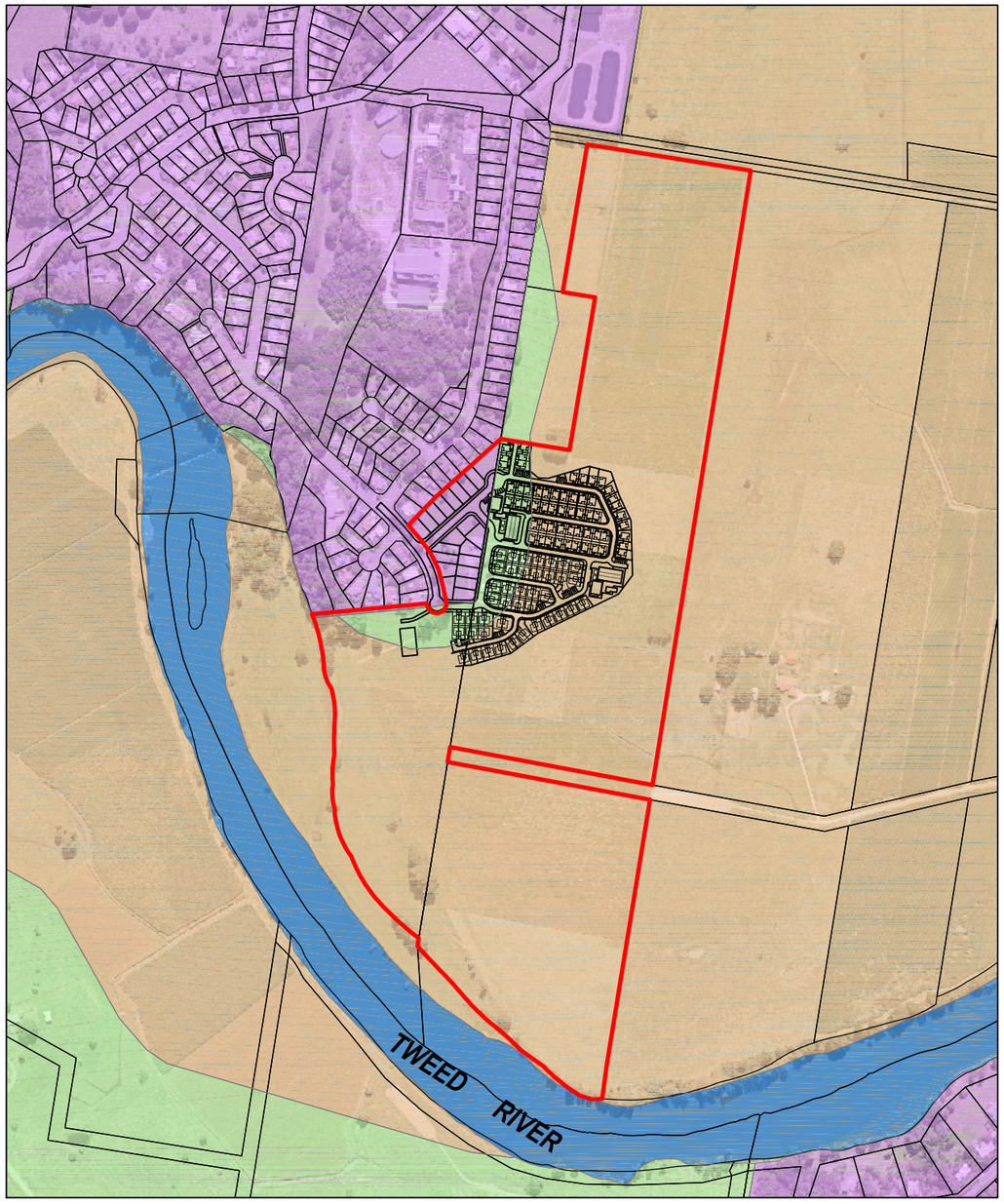
SCALE 1:2000 AT A3

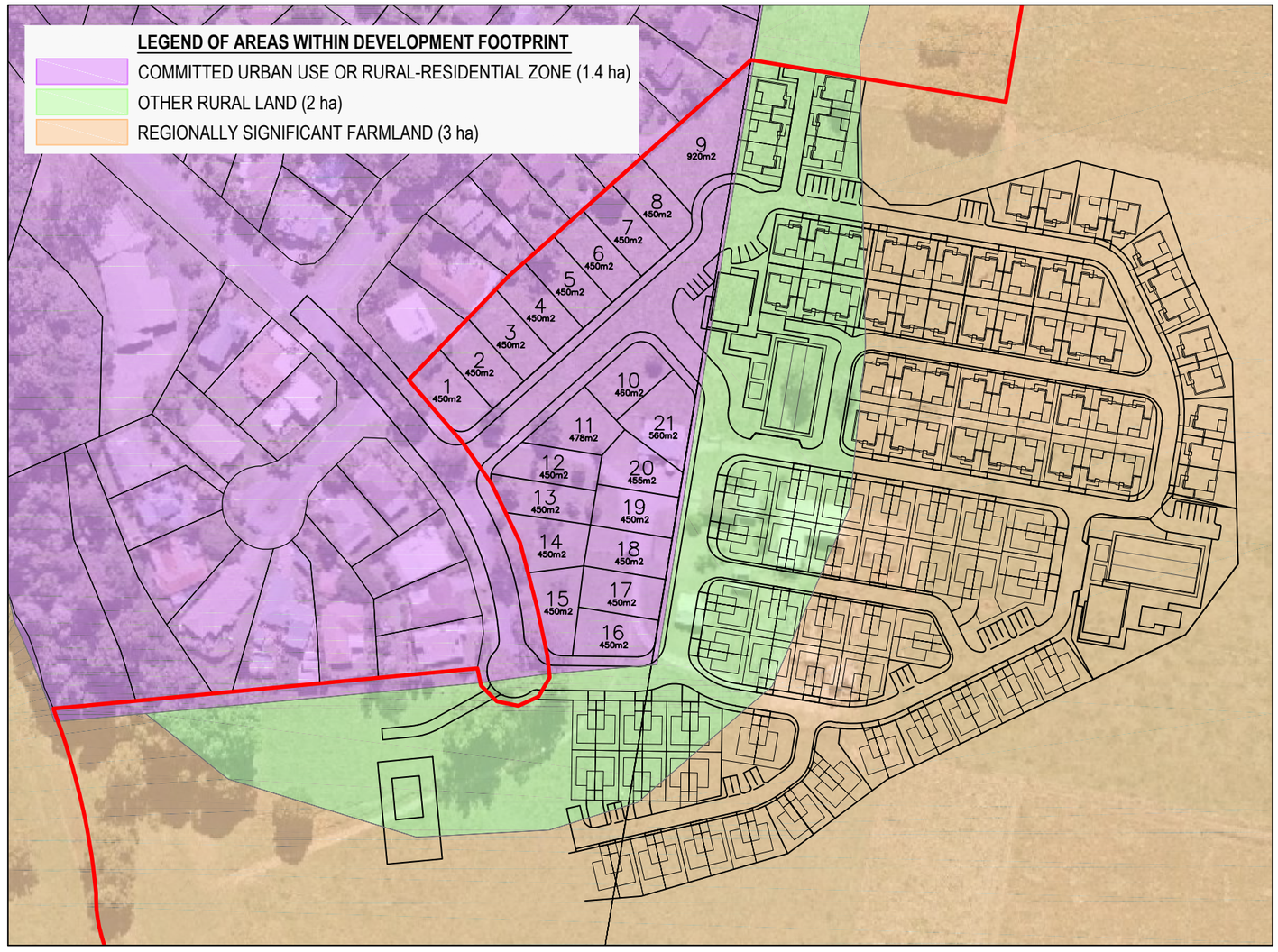
Project: LOT 18 IN DP627632 & LOT 22 IN DP1170438 49 ELOUERA TERRACE BRAY PARK

Title: PLAN OF NORTH COAST AGRICULTURAL LAND CLASSIFICATION



PLAN OF SITE BOUNDARY WITH
FARMLAND OF STATE & REGIONAL SIGNIFICANCE
SCALE: 1:8000

LEGEND OF AREAS WITHIN SITE BOUNDARY
- COMMITTED URBAN USE OR RURAL-RESIDENTIAL ZONE (1.4 ha)
- OTHER RURAL LAND (2 ha)
- REGIONALLY SIGNIFICANT FARMLAND (33.15 ha)
- SITE BOUNDARY, 36.55 ha Approx.



PLAN OF DEVELOPEMENT WITH
FARMLAND OF STATE & REGIONAL SIGNIFICANCE
SCALE: 1:2000

MGA

Figure 8

SOURCE:
AERIAL: https://maps.six.nsw.gov.au

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		Issue	A

160 80 0 200 400
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40 20 0 50 100
SCALE 1:2000 AT A3

Project: LOT 18 IN DP627632 & LOT 22 IN DP1170438 49 ELOUERA TERRACE BRAY PARK

Title: PLAN OF FARMLAND OF STATE & REGIONAL SIGNIFICANCE

3. Agricultural Impacts

3.1 Proposal

As described above, the proposal is to develop approximately 6ha for residential and seniors living. The proposal will subsequently include standard residential allotments from 450m^2 and seniors housing dwellings on 150-250m^2 parcels with community facilities. The proposal applies an SCC process to allow permissibility for seniors housing as an extension to the neighbouring R2 zone. This will be concentrated on the upper elevations of the site. The remainder of the Subject Site would remain as RU1 and due to site constraints is expected to remain undeveloped.

To assess this proposal an additional 40m buffer has been applied as this is considered a plausible buffer zone anticipated to minimise any Land Use Conflicts between the proposal and ongoing Agricultural activities on the remainder of the Subject Site. As such, including this buffer area, approximately an additional 2 ha is included as potentially being unavailable for Agricultural activities.

3.2 Agricultural Characteristics

The majority of the Subject Site is considered to have good agricultural characteristics. The soils of the site are, in general, considered deep and fertile. That is, within the areas of the site which are flat and of lower elevation.

However, this area is also located within a floodplain. Thereby, both historically and continuing, agricultural pursuits need to be adaptive to the ephemeral nature of flooding regimes. As such, agricultural pursuits are limited to such crops that can withstand inundation (e.g. Sugar Cane) or livestock pursuits whereby animals can be moved to higher ground in times of flood.

A further limitation is the potential presence of Acid Sulfate Soils. Mapping indicates much of the area as having a low probability. While the presence of these soils may be low, consideration on any extensive land reformation (e.g. for Macadamia plantation) potentially would provide a further limitation.

The elevated area of the site is considered of less agricultural quality (i.e. the location of the proposed development). The soils of this area are shallower, stony and of poorer fertility. In addition, this area is also located in close proximity to urban landuses. Thereby, any attempt to undertake intensive agricultural pursuits are likely to cause land use conflicts. The area does represent an elevated area for the location of farm infrastructure. The existing infrastructure is a result of the range of historical agricultural pursuits. The majority of this infrastructure is now superfluous to the current pursuit (cattle grazing). In essence, only a cattle loading ramp and yards are required. Such facilities can be provided as temporary facilities allowing for its positioning to be varied or removed during periods of floods.

The Study Area (proposal area plus 2ha for buffering) represents the following agricultural land within the Subject Site:

North Coast Agricultural Land Classification:

- Class 3 - Suited to grazing, including the use of improved pastures: 20%.

The remaining Study Area is mapped as:

- Class 4 - Suitable for grazing, but not for cultivation: 48%.
- Class 9 or Urban Area: 27%.

Farmland of State and Regional Significance;

- Regionally Significant Farmland: 15%.

The remaining Study Area is mapped as:

- Other Rural Land: 100%.
- Committed Urban Use or Rural-Residential Zone: 1.4%.

As previously mentioned, part of the proposal area is already zoned R2 Low Density Residential and this accounts for approximately 3.3% of the Subject Site.

The Tweed Shire LGA covers an area of approximately 130,000 ha. The proposal (including buffer) covers approximately 8ha or 0.006% of the LGA. Data for the individual Agricultural Class for the entire LGA was not readily available. Some extensive works would be required to obtain such data. As the entire site only represents 0.006% of the LGA, an example of the loss of one Agricultural Class (e.g. Class 3) could be estimated to be 0.096% (i.e. 16% x 0.006%) from with the LGA.

To further demonstrate the small area of agricultural lands lost by the proposal, calculation for such lands within the immediate locality (approximately 2km surrounding the site) has been completed and the following is provided:

North Coast Agricultural Land Classification:

- Class 3 - The proposal represents approximately 1.4% of similar lands within 2km of the site.
- Class 4 - The proposal represents approximately 6.5% of similar lands within 2km of the site.

Farmland of State and Regional Significance:

- Regionally Significant Farmland: The proposal represents approximately 1.3% of similar lands within 2km of the site.

Thereby it is surmised within the LGA, these areas would represent significantly lower areas and well under 1%.

3.3 Agricultural Impacts by the proposal

The Subject Site is considered to consist of relatively good Agricultural lands. However, the Proposal Area consists of Agricultural Lands of lower value.

Based on soil and climate consideration only, it is considered a range of agricultural activities could be pursued. However, a major natural characteristic precludes the Study Area being utilised for a range of high intensity, high value agricultural pursuits (e.g. orchards, plant nursery, intensive animal production). Flooding is considered restrictive for these pursuits as flooding would cripple any infrastructure installed (e.g. machinery, internal roads, buildings and the like). Historically the site has most likely been used for grazing purposes through the majority of its history and this would remain the most viable option for ephemeral use of the land (i.e. ease of moving stock during times

of flood). While Sugar Cane was grown on the site (for 30-35 yrs), the size of the property and required inputs have resulted in this being unviable.

The conflicts between Agriculture and urbanisation is likely to possibly be occurring at the site and may also have influenced the continuation of Sugar Cane production. Any intensive agricultural pursuits would similarly create conflicts.

Conflicts often occur due to either direct or perceived impacts by both parties and include:

- air quality due to agricultural and rural industry (odour, pesticides, dust, smoke and particulates);
- use and enjoyment of neighbouring land e.g. noise from machinery;
- visual amenity associated with rural industry e.g. the use of netting, planting of monocultures and impacts on views;
- soil erosion leading to land and water pollution;
- clearing of native vegetation;
- stock access to waterways;
- harassment of livestock from straying domestic animals;
- trespass;
- changes to storm water flows or water availability; and
- poor management of pest animals and weeds.

While the proposal removes a small area of medium quality Agricultural land from the Tweed LGA, the majority of the Subject Site would be retained for agricultural purposes. Sufficient buffers can be included to reduce any land use conflicts.

4. Discussion and Conclusion

Melaleuca Group Pty Ltd has been commissioned by Marjan Management Pty Ltd to undertake an Agricultural Assessment for 49 Elouera Terrace, Bray Park NSW 2484 (the site) to allow for a proposed Residential Subdivision and Seniors housing development on part of the Site.

The investigation was completed using desktop resources, interview with long-term landowner along with a site inspection. The physical characteristics of the Subject Site, obtained from desktop resources, indicate the Site does representative good Agricultural land for the Tweed area. However, the Study (or proposal) Area is considered to be located on lands of lesser Agricultural land value within the Site.

The Site is predominantly flood prone. As such, limitations on intensifying agricultural pursuits are limited due to the inherent risk on infrastructure for such activities. Historical and future agricultural pursuits need to be adaptive to the ephemeral nature of flooding regimes. As such, it is considered likely that low intensity grazing and cropping such as Sugar Cane are the most likely pursuits suitable for the Site. The proposal area represents a limited space for any such activities as the soils and topography are not suited to cropping. In addition, the existence of the properties' dwelling and farm infrastructure along with its proximity to existing residential properties precludes this area for such activities.

The proposal will result in the extension of an existing urban area. Part of the proposal is within an area zoned for such (i.e. R2 Low Density Residential). As such, the proposal will not result in the isolation of the better agricultural lands of site.

The Subject Site and to a lesser amount, the proposal represents very small areas of medium to good agricultural lands within the LGA. Within 2km of the site an estimated area of <2% of regionally significant farmland would be lost. Within the LGA, this area would be well below 1% (estimated < 0.01%).

In conclusion, this Agricultural Assessment has identified that while the Site as a whole demonstrates medium to good agricultural characteristics, flooding, proximity to urbanisation and the small scale of the proposal does not represent a significant impact on agricultural lands in the LGA.

5. References

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Tweed Shire Council (TSC) 2019, Online mapping (www.tweed.nsw.gov.au/Mapping)

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